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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/703,075	10/31/2000	Jose J. Garcia-Luna-Aceves	59864.00120	1257

32294 7590 02/09/2004

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EXAMINER	
PHILPOTT, JUSTIN M	
ART UNIT	PAPER NUMBER
2665	22

DATE MAILED: 02/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

Office Action Summary	Application No. 09/703,075	Applicant(s) GARCIA-LUNA-ACEVES ET AL.	
	Examiner Justin M Philpott	Art Unit 2665	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED. (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 25 November 2003.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-4,6-15 and 17-23 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-4,6-15 and 17-23 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .

4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: .

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed November 25, 2003 have been fully considered but they are not persuasive.

First, applicant argues (page 14, second paragraph, continued on page 14) that Meier`436 fails to disclose incoming and outgoing collision-free links of the first node that are already scheduled as recited in the amended claims 1, 12 and 18. However, as discussed in the previous office action, Meier`436 teaches maintaining a spanning tree which comprises the incoming and outgoing collision-free links of the nodes (e.g., see col. 21, lines 10-13). Further, Meier`436 teaches the schedule packet (e.g., HELLO packet/message, see col. 21, lines 17-20) transmits messages maintaining the local information, wherein the local information comprises information that specifies how communication packets received should flow through the bridging node toward the destination (e.g., see col. 21, lines 5-9). That is, the local information within the schedule packet comprises information regarding the spanning tree. Thus, Meier`436 teaches the schedule packet (e.g., HELLO packet) comprises incoming and outgoing collision-free links (e.g., local information corresponding to the spanning tree) of the first node that are already scheduled. Thus, applicant's argument that Meier `436 fails to teach such a limitation is not persuasive.

Second, applicant argues (page 14, first paragraph to page 15, first paragraph) that "there is no compatibility between the methods recited in Shepard and Aaronson". Specifically, applicant argues that the application of the synchronous protocol of Aaronson would not be

compatible with the self-organizing channel management system of Shepard. However, as discussed in the previous office action, Shepard introduces a method of decentralized channel management for providing collision-free packet transfer wherein the nodes (e.g., stations) exchange scheduling information (e.g., schedules) which includes information on when and in what order the transmissions may occur in the network (e.g., see col. 9, line 58 – col. 10, line 4 regarding scheduling a time for transmission with respect to transmit and receive windows). By exchanging scheduling information which includes information on when and in what order the transmissions may occur in the network, Shepard provides collision-free packet transfer wherein interference of neighboring stations is avoided and accordingly energy typically used for retransmissions is conserved. As also discussed in the previous office action, Aaronson teaches a space and time switched (STS) communications protocol for wireless communications whereby time is broken up into frames, further divided into slots (e.g., see col. 4, lines 22-44). The teachings of Aaronson are directed towards enabling efficient data transmission in various packet network topologies (e.g., see col. 2, lines 60-64). Specifically, the teachings of Aaronson enables the creation of multiple simultaneous transmission links between subgroups and peers of nodes which provides dramatic increases in the efficient use of spectrum at a given region, route diversity and load balancing (e.g., see col. 3, line 61 – col. 4, line 2). As discussed above, the teachings of Shepard are directed towards scheduling transmission times (e.g., see col. 9, line 58 – col. 10, line 4). As also discussed above, the teachings of Aaronson are similarly directed towards transmission scheduling (e.g., see col. 3, lines 30-67). Thus, the packet network transmission scheduling teachings of Aaronson may advantageously be applied to the similarly directed packet network transmission scheduling teachings of Shepard. Furthermore, at the time

of the invention one of ordinary skill in the art would be motivated to apply the teachings of Aaronson to that of Shepard in order to provide packet network transmission scheduling whereby dramatic increases in the efficient use of spectrum at a given region, route diversity and load balancing are achieved (e.g., see Aaronson col. 3, line 61 – col. 4, line 2). Thus, applicant's argument that the teachings of Aaronson would not be compatible with the teachings of Shepard is not persuasive.

Claim Rejections - 35 USC § 103

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 1-4, 6-15, 17 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,394,436 to Meier et al. (Meier `436) in view of U.S. Patent No. 5,682,382 to Shepard, further in view of U.S. Patent No. 5,748,619 to Meier (Meier `619), further in view of U.S. Patent No. 6,363,062 to Aaronson et al.

Regarding claims 1 and 12, Meier `436 teaches an RF communications system comprising a plurality of non-collocated nodes (e.g., see FIG. 1, bridges 40 and 50), each capable of receiving and transmitting transmissions on a first interface (e.g., RF links 106 and 114), and a plurality of collocated nodes (e.g., bridges 24 and 42), each capable of communicating between one another over a second interface (e.g., data communication link 16). Furthermore, each of the plurality of collocated nodes is capable of receiving and transmitting transmissions to and from the plurality of non-collocated nodes on the first interface (e.g., via RF links 104 and 110). Collocated nodes exchange scheduling information with one another over the second interface

(e.g., see col. 3, line 4 – col. 4, line 19), wherein the scheduling information is associated with transmissions between the plurality of collocated nodes and each of the non-collocated nodes on the first interface (e.g., RF links 106 and 114). The scheduling information determines a schedule (spanning tree, see col. 3, lines 49-55) for the plurality of collocated nodes (e.g., bridges 24 and 42) for transmission between the plurality of collocated nodes and each of the plurality of non-collocated nodes (e.g., bridges 40 and 50) on the first interface. Further, Meier `436 teaches a schedule packet (e.g., HELLO packet) is sent from one or more collocated node(s) to each other collocated node which includes: an indication of all known nodes (e.g., combination of the spanning tree and the detached-node list, see col. 13, line 20-22), including those within a 2-hop neighborhood of each previous node, and incoming and outgoing collision-free links of the node(s) that are already scheduled (e.g., local information corresponding to the spanning tree, see col. 21, lines 5-20). Meier `436 also includes nodes constantly listening while not in active scheduled links (e.g., see col. 7, lines 35-39).

However, Meier `436 may not specifically disclose the schedule information (e.g., spanning tree) includes information on when and in what order the transmissions may occur in the network.

Shepard, like Meier `436, teaches a method involving packet radio network communications systems. Shepard, however, further teaches decentralized channel management for providing collision-free packet transfer (e.g., see col. 2, line 21 – col. 3, line 20). Shepard discloses that it is known in the art of packet radio network communications systems that such systems are prone to interference and often require retransmissions due to overlapping transmit and receive windows and thus, waste power for completing such retransmissions (e.g., see col. 1,

line 15 – col. 2, line 18). To solve this problem, Shepard introduces a method of decentralized channel management for providing collision-free packet transfer wherein the nodes (e.g., stations) exchange scheduling information (e.g., schedules) which includes information on when and in what order the transmissions may occur in the network (e.g., see col. 9, line 58 – col. 10, line 4 regarding scheduling a time for transmission with respect to transmit and receive windows). By exchanging scheduling information which includes information on when and in what order the transmissions may occur in the network, Shepard provides collision-free packet transfer wherein interference of neighboring stations is avoided and accordingly energy typically used for retransmissions is conserved (e.g., see col. 2, line 21 – col. 3, line 20). Thus, at the time of the invention it would have been obvious to one of ordinary skill in the art to include the scheduling information of Shepard with that of Meier `436 in order to provide a packet radio network communications network having collision-free packet transfer wherein interference of neighboring stations is avoided and accordingly energy typically used for retransmissions is conserved.

However, Meier `436 in view of Shepard may not specifically disclose a first collocated node includes two or more discrete nodes sharing a transmitter to communicate with one or more of the non-collocated nodes.

Meier `619 teaches methods for wireless LANs similar to Meier `436, however, Meier `619 further teaches a first collocated node (e.g., subnet 401 in FIG. 8) includes a plurality of discrete nodes (e.g., host 407 and PC 409) sharing a transmitter (e.g., 425) to communicate with one or more of the non-collocated nodes (e.g., 431 and 433). The teachings of Meier `619 provide for routing data through a wired and wireless communications network efficiently,

dynamically, without looping, and with minimal impact upon experiencing lost network nodes (e.g., see col. 2, lines 57-67). Thus, at the time of the invention it would have been obvious to one of ordinary skill in the art to apply the teachings of Meier `619 to the method of Meier `436 in view of Shepard in order to route data through a wired and wireless communications network efficiently, dynamically, without looping, and with minimal impact upon experiencing lost network nodes.

Meier `436 in view of Shepard in view of Meier `619, however, may not specifically include time slots and data channels in which new links can be reserved and on which nodes will be listening.

Aaronson teaches time slots and data channels (e.g., see col. 4, lines 22-62) in which new links can be reserved (e.g., lines 34-36) and on which nodes will be listening (e.g., to requests and grants on control channel, see col. 4, lines 51-55). Applying the scheduling method of Aaronson to the system of Meier `436 in view of Shepard in view of Meier `619 would provide an improved means for scheduling within a hard-wired and wireless communications network. Specifically, the teachings of Aaronson provide dramatic increases in the efficient use of spectrum within a region, route diversity, and load balancing for packet carried information (e.g., see col. 3, line 47 – col. 4, line 2). Thus, at the time of the invention it would have been obvious to one of ordinary skill in the art to use the communications protocol of Aaronson with the system of Meier `436 in view of Shepard in view of Meier `619 in order to, e.g., provide dramatic increases in the efficient use of spectrum within a region, route diversity, and load balancing for packet carried information.

Regarding claims 2 and 13, Meier `436 teaches a preferred embodiment wherein collocated nodes exchange scheduling information (e.g., HELLO packet) over the first interface during a time frame (e.g., two seconds, see col. 20, lines 7-8) such that data is also sent by the non-collocated nodes over the second interface during the time frame (e.g., see col. 20, lines 2-5 regarding five millisecond data packet segments).

Regarding claims 3, 4, 14 and 15, Aaronson teaches a communications protocol for wireless communications whereby time is broken up into frames, further divided into slots (e.g., see col. 4, lines 22-44). A control channel, comprising slots used for control information, as well as a data channel, comprising the remaining slots, are provided within each frame. Thus, Aaronson teaches improved means of wireless communications having a first and second time frame in the form of a control channel and a data channel, or control and data portions. Specifically, as discussed above, the teachings of Aaronson provide dramatic increases in the efficient use of spectrum within a region, route diversity, and load balancing for packet carried information (e.g., see col. 3, line 47 – col. 4, line 2). Aaronson also teaches wireless communications links such as those found in the second interface of Meier `436 (e.g., RF links) whereby both control information and data are transmitted. Thus, the teachings of Meier `436 in view of Shepard in view of Meier `619 would clearly benefit from implementing the communications protocol of Aaronson. Such a combination would provide more reliable transmission between non-collocated and collocated nodes whereby both control information and data could be transmitted between nodes. Furthermore, as discussed above, the teachings of Aaronson provide dramatic increases in the efficient use of spectrum within a region, route diversity, and load balancing for packet carried information. Thus, at the time of the invention it

would have been obvious to one of ordinary skill in the art to use the communications protocol of Aaronson with the system of Meier `436 in view of Shepard in view of Meier `619 in order to, e.g., provide dramatic increases in the efficient use of spectrum within a region, route diversity, and load balancing for packet carried information.

Regarding claim 6, Meier `436 teaches sending a schedule packet (which is part of the information comprised within HELLO packet, see col. 12, line 61 – col. 13, line 27) from a first at least one of a plurality of collocated nodes (e.g., bridges) to a second at least one collocated node of the plurality of collocated nodes over a first interface (e.g., RF links) as well as sending, in response to receiving the schedule packet, an acknowledgement packet (e.g., ATTACH.request, see col. 4, lines 29-31) from the second to the first collocated node(s).

Regarding claim 7, Meier `436 teaches the further steps of: setting a sequence number (e.g., count of nodes or number of hops, see col. 4, lines 9-19) to the value of the sequence number of the schedule packet (e.g., part of HELLO packet) received; sending a hello packet (e.g., part of HELLO packet) which identifies the sending collocated node(s) (e.g., address of the sender, see col. 4, line 9) and a sequence number (e.g., count of nodes or hops, see col. 4, line 11) of a last sent schedule packet from the first collocated node(s); determining if the sequence number of the last sent schedule packet is less than the sequence number of a last received schedule packet (e.g., see col. 4, lines 54-67); and in response to a positive determination: transmitting a hello response to the previous sending collocated node(s) which includes the sequence number for the last received schedule packet. This last step of determining and transmitting is taught by Meier `436 in col. 4, lines 54-61 in combination with col. 4, lines 27-39, wherein a block 215 at the receiving node (e.g., bridge) determines whether the sequence number

(e.g., count of nodes or hops, distance to the root node) provided by the received schedule packet (e.g., HELLO packet) is less than the sequence number (e.g. distance to the root node) provided by the previous schedule packet (e.g., HELLO packet). If positive determination is made, a hello response (e.g., ATACH.request) is transmitted to the previous sending collocated node(s). Thus, the receiving collocated node(s) maintains position according to the smallest sequence number, i.e., maintains attachment to the spanning tree at the node that is logically closest to the root node (e.g., see col. 4, lines 59-61).

Regarding claim 8, Meier `436 teaches another embodiment (e.g., see col. 5, lines 6-10) similar to that described above, but which further comprises sending a second hello packet (e.g., ATTACH.response) from the first collocated node(s) in response to resetting the sequence number (e.g., count of nodes or hops) to the larger of the last sent schedule packet (e.g., previous count of nodes or hops) or 1 plus the last received schedule packet (e.g., current possible count of nodes or hops) which was received in hello response (e.g., HELLO).

Regarding claim 9, the teachings of Meier `436 as discussed above regarding claim 7 apply here, wherein if a negative determination is made from the determining step of claim 7, the receiving collocated node(s) still maintain position according to the smallest sequence number, i.e., maintains attachment to the spanning tree at the node that is logically closest to the root node (e.g., see col. 4, lines 59-61).

Regarding claims 10, 11 and 17, Meier `436 teaches a first interface comprising a wired link (e.g., hard-wired communication link, see col. 3, lines 12-13) and a second interface comprising a wireless link (e.g., RF links, see col. 3, line 15). Further, regarding claim 11, Meier

`436 discloses RF transmission (e.g., see col. 3, lines 4-19) and Examiner takes official notice that it is well known in the art to utilize orthogonal channels to provide suitable RF transmission.

Regarding claim 23, as discussed above regarding claims 1 and 12, the schedule of Shepard is a conflict-free transmission schedule (e.g., see col. 2, line 21 – col. 3, line 20; and col. 9, line 58 – col. 10, line 4).

4. Claims 18-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Meier `436 in view of Shepard in view of Meier `619 in view of Aaronson, further in view of U.S. Patent No. 5,673,031 to Meier (hereinafter referred to as Meier `031).

Regarding claim 18, Meier `436 in view of Shepard in view of Meier `619 in view of Aaronson teaches an apparatus as described above regarding claim 1, however, may not specifically disclose using routers.

Meier `031 teaches a further advancement for a packet radio network communications system such as the system taught by Meier `436. Meier `031 teaches a redundant RF network having a roaming terminal communication protocol to provide communications to remote terminals at greater distances without increasing base station range which would increase power consumption and increase collisions (e.g., see col. 2, lines 16-23 and col. 3, lines 1-29). Meier `031 further teaches advantageously implementing routers as communication nodes to provide guaranteed coverage for fringe areas without adding additional wiring and to provide continuing coverage when a wired base fails (e.g., see col. 30, line 54 – col. 32, line 23). Thus, at the time of the invention it would have been obvious to one of ordinary skill in the art to implement routers as taught by Meier `031 for the communicating entities in the RF communications

network of Meier `436 in view of Shepard in view of Meier `619 in order to provide communications to remote terminals at greater distances without increasing base/station range and in turn without increasing power consumption or collisions, and wherein guaranteed coverage for fringe areas is provided without adding additional wiring and furthermore wherein continuing coverage is provided when a wired base fails.

Regarding claim 19, as discussed above regarding claims 2 and 13, Meier `436 teaches a preferred embodiment wherein collocated nodes exchange scheduling information (e.g., HELLO packet) over the first interface during a time frame (e.g., two seconds, see col. 20, lines 7-8) such that data is also sent by the non-collocated nodes over the second interface during the time frame (e.g., see col. 20, lines 2-5 regarding five millisecond data packet segments).

Regarding claim 20, as discussed above regarding claims 10, 11 and 17, Meier `436 teaches a first interface comprising a wired link (e.g., hard-wired communication link, see col. 3, lines 12-13) and a second interface comprising a wireless link (e.g., RF links, see col. 3, line 15).

Regarding claims 21 and 22, as discussed above regarding claims 3, 4, 14 and 15, Aaronson teaches a communications protocol for wireless communications whereby time is broken up into frames, further divided into slots (e.g., see col. 4, lines 22-44). A control channel, comprising slots used for control information, as well as a data channel, comprising the remaining slots, are provided within each frame. Thus, Aaronson teaches improved means of wireless communications having a first and second time frame in the form of a control channel and a data channel, or control and data portions. Specifically, the teachings of Aaronson provide dramatic increases in the efficient use of spectrum within a region, route diversity, and load balancing for packet carried information (e.g., see col. 3, line 47 – col. 4, line 2). Aaronson also

teaches wireless communications links such as those found in the second interface of Meier `436 (e.g., RF links) whereby both control information and data are transmitted. Thus, the teachings of Meier `436 in view of Shepard in view of Meier `619 in view of Meier `031 would clearly benefit from implementing the communications protocol of Aaronson. Such a combination would provide more reliable transmission between non-collocated and collocated nodes whereby both control information and data could be transmitted between nodes. Furthermore, as discussed above, the teachings of Aaronson provide dramatic increases in the efficient use of spectrum within a region, route diversity, and load balancing for packet carried information. Thus, at the time of the invention it would have been obvious to one of ordinary skill in the art to use the communications protocol of Aaronson with the system of Meier `436 in view of Shepard in view of Meier `619 in view of Meier `031 in order to, e.g., provide dramatic increases in the efficient use of spectrum within a region, route diversity, and load balancing for packet carried information.

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Justin M Philpott whose telephone number is 703.305.7357. The examiner can normally be reached on M-F, 9:00am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Huy D Vu can be reached on 703.308.6602. The fax phone number for the organization where this application or proceeding is assigned is 703.872.9314.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703.305.4750.

jmp
Justin M Philpott

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